

Surgical Technique

Revision Procedure

 **smith&nephew**

**RENOVATION<sup>®</sup>**

Knee Implant Extraction  
Instrument System





# RENOVATION<sup>◇</sup> Knee

## For Revision Procedure

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### Warnings

They are written in orange. They must be followed as they relate to critical functions or this information should be noted as it contains valuable advice which helps the user to clinically apply the system.

### Nota bene

The surgical technique described here is made available to the healthcare professional to illustrate the author's suggested treatment for the procedure. In the final analysis, the preferred treatment is that which addresses the needs of the patient.

### Disclaimer

The following technique is for informational and educational purposes only. It is not intended to serve as medical advice. It is the responsibility of treating physicians to determine and utilize the appropriate products and techniques according to their own clinical judgment for each of their patients. For more information on the RENOVATION Knee extraction system, including its indications for use, contraindications, and product safety information, please refer to the product's label and the Instructions for Use packaged with the product. Prior to performing this technique, please consult the Instructions for Use documentation provided with each device for additional health and safety information, including indications, contraindications, warnings and precautions.

# Introduction

Removal of knee implants is one of the most challenging procedures orthopaedic surgeons face. Preoperative planning is difficult and often the extent of loosening cannot be assessed until the implant is fully exposed. In addition, the many different prosthetic designs require various removal techniques.

For these reason Smith & Nephew, with the RENOVATION Knee system, offers the surgeons a knee specific implant extraction set that contents different instrument options to facilitate the removal of different femur and tibia components (loose first and then extract secondly).

Although challenging, preoperative planning is the key to prosthetic removal. Familiarity with the design of the prosthesis being removed is crucial as some design features increase the difficulty of removal and require specialized instrumentation and techniques. The following is a guide to the Smith & Nephew RENOVATION Knee Implant Extraction Instrument System and suggested techniques employed in prosthesis removal.



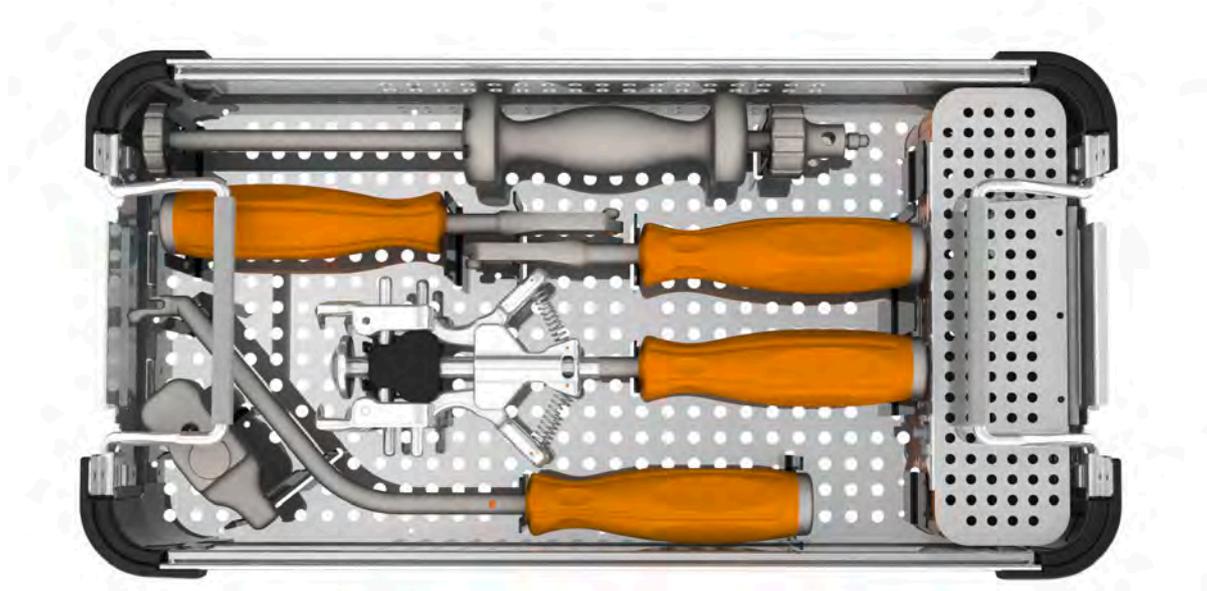
## **Note**

As specific for knee, the RENOVATION knee system is not intended for use on other joint than knee. As well, the instruments (especially the extraction clamp) are intended for extraction and not for implanting/impacting the components!

## Concept/Description

With the high number of knee revision surgeries performed worldwide, we have been confronted by surgeon requests to offer – in addition to our standard revision instrument set for implanting - a knee specific set of instruments, to support the surgeon requirement for knee implants removal.

To cover this demand the RENOVATION® Knee Implant Extraction Instrument System has been developed.



In addition to the basic set (75210243), chisel blades and saw blades in sterile packaging are offered for single use. This allows the surgeon to choose the best instruments for the specific situation of releasing the implants from surrounding bone.

With the RENOVATION Knee Implant Extraction Instrument System and the use of these optional instruments, various tricompartmental knee systems can be removed.

## Product Description



### Extraction Clamp

The extraction clamp (75100382) has been designed to be used for extracting various femoral and tibial component designs, from a medio-lateral (M-L) width starting with 50mm to a maximum of 100mm. The Y designed clamp, enables tightening forces to the jaws by simultaneous hammering out/pulling the clamp. The slap hammer (75100394) can be fixed to the top of extraction clamp handle to facilitate extraction. Be aware that both jaws can be exchanged by using a spare part jaw (75100684). This can be done by removing the screw on the side (the jaw can be exchanged on either side – symmetrical).

#### Important

The extraction clamp is not designed for impacting components, but just for extracting knee components (femur or tibia).

Do not hammer onto the silicon handle to retract the extraction clamp, but use the slap hammer instead.

For the extraction clamp an Instructions for use - Knee extraction kit (E1390) - is available. This document covers; cleaning instruction, instructions for use and clamps replacement instructions.

### Slap Hammer



The slap hammer (75100394) can be attached to the extraction clamp, as well as on the hook. It can also be used on the chisel handle, if the chisel gets stuck during use.

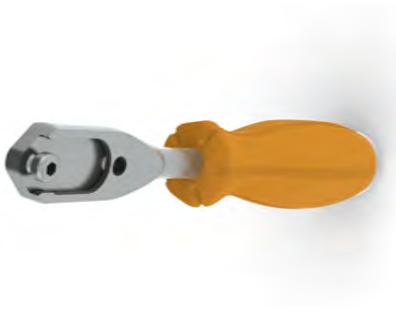
### Puncher



The puncher (75100388) is used once the femoral component has been loosened as much as possible by the osteotomes. To dislocate the femoral component; apply the puncher tip to the proximal edge of the anterior flange of the femoral component to dislocate the component. To avoid anterior-posterior tilting, the extraction clamp can be placed to enable straight extraction.

## Chisel Handle

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The chisel handle (75100390) is a modular handle that supports multiple chisel blade designs available in our portfolio (see portfolio overview on page 19).

The exchange of the chisel blades is performed simply by loosening and tightening the set screw with the Allen Wrench (SW3.5mm = 9/64") provided in the set.

In case of the chisel blade getting stuck, the slap hammer (75100394) can be fixed by the screw at the top of the handle in order to easily remove it. The slap hammer can also be used for hammering in and out.

### Important

Do not hammer onto the silicon handle to retract the chisel-blade, but use the slap hammer instead.

## Hook Adapter

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The hook (75100387), used in combination with the slap hammer (75100394), is intended to help the surgeon to pull/liberate the components in areas where the access (e.g. due to soft tissues) is limited.

In addition, it is an ideal instrument for pulling off the femoral component when placed at the femoral distal trochlea groove or the tibial component when placed at tibial posterior cruciate ligament (PCL) recess.

Note that there is a round lateral plate that can be used to hammer the hook in place.

### Chisel Blades (sterile)

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Multiple chisel blade designs are available for liberating most area of the femoral or tibial components.

They are packaged sterile, so that the surgeon can intraoperatively choose appropriate chisel blades for dislocating the components.

The chisel blades overview is presented on page 19.



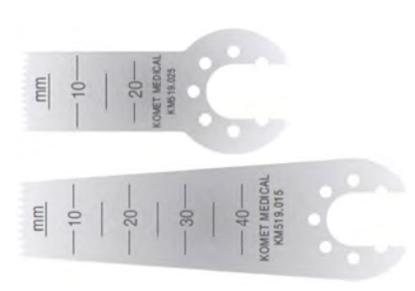
### Saw Blades (sterile)

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Thin saw blades with different connection are offered for liberating femoral or tibial components.

They are packaged sterile, so that the surgeon can intraoperatively choose appropriate saw blades for dislocating the components.

The saw blades overview is presented on page 19.



# Femoral Component Extraction

Access: Please refer to the relevant surgical textbooks for the initial access to the knee. The leg is flexed for good exposure of the knee joint.

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## Liberate the Joint



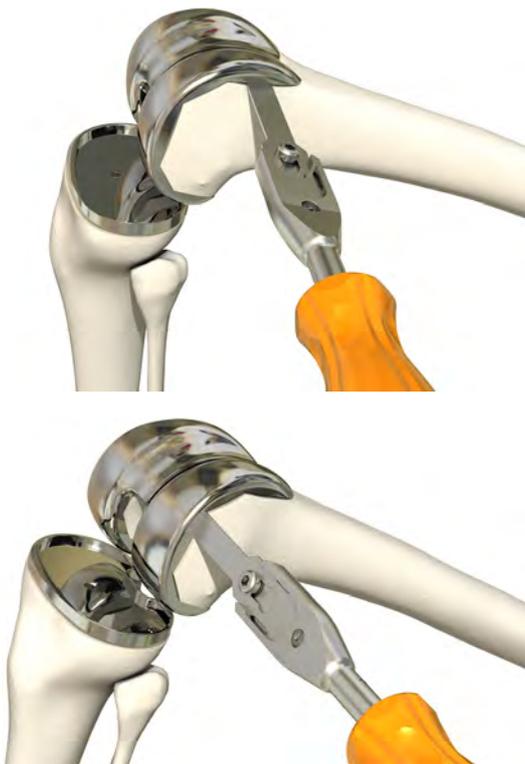
For better exposure, the tibial insert is first extracted.

### Important

Pay attention to check before surgery about the type of insert design (e.g.: fix bearing or mobile bearing) and eventually the need of specific instrument (e.g.: screwdriver) to remove the insert (preoperative planning).

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## Liberate the Femur



Before extraction, the femoral component has to be loosened first.

By using different chisel blades, the anterior flange and lateral/medial condyle regions of the femoral component can be liberated.

### Important

Be aware that most primary femoral components have stabilization pegs on both internal distal condyles. Some primary femoral components also incorporate quite a prominent reinforcement of the trochlea groove. Use the chisel carefully in order to minimize the risk of creating metal debris. Preoperative planning prior to any knee revision surgery is highly advised.

Do not hammer onto the silicon handle to retract the chisel-blade, but use the slap hammer instead.

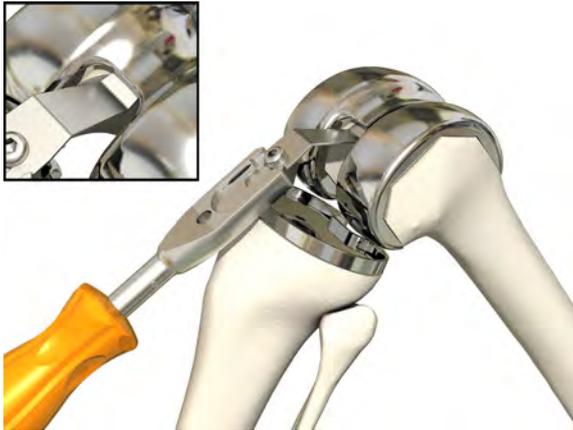


Using a lateral or medial access, thin saw blades can also be used for loosening the femoral component.

### Important

Be careful with stabilization pegs, the femoral posterior stabilised (PS) box or in case of a prominent trochlea groove in order to avoid any metal debris.

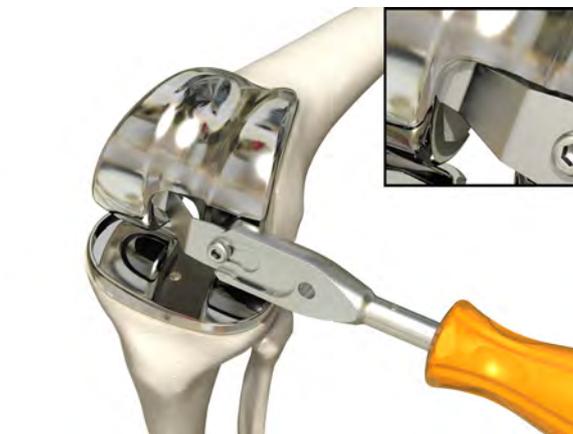
## Liberate the Internal Femoral Zone



The use of an offset chisel blade allows the loosening of the internal femoral distal trochlea region.

### Important

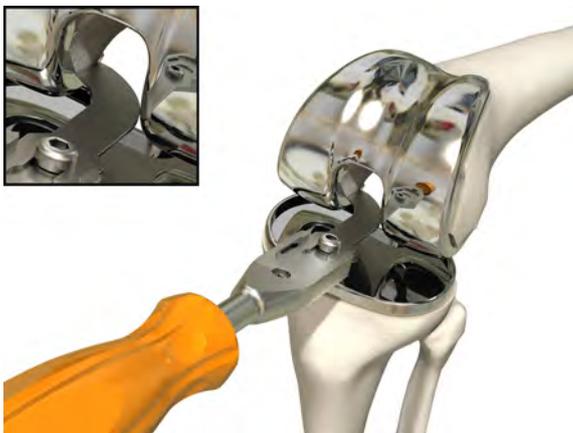
Be aware that some primary femoral components present rounded or square reinforcement for the trochlea groove.



The use of an offset chisel blade allows the loosening of the internal region of the medial/lateral femoral condyles.

### Important

Be aware that most primary femoral components have stabilization pegs on both internal distal condyles.

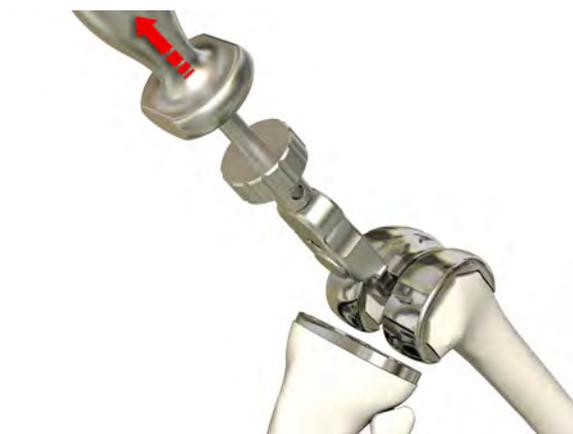


The use of lateral curved chisel blades allows the loosening of the internal posterior femoral condyles.

### Important

This chisel blade is not needed to be hammered. It's just positioned and by using the opposite condyle as a lever, the chisel tip is inserted between bone and implant.

## Dislocate the Femoral Component



In order to remove the femoral component, insert the hook adapter into the femoral distal trochlea groove and use the slap hammer for extraction.

### Important

If need to hammer the hook in place, please use the foreseen lateral plate on the hook (do not hammer the slap hammer).



Alternatively, insert the hook adapter into the medial or lateral condyle and use the slap hammer for extraction.

Use this approach – if possible – especially in case of the removal of PS or REVISION femoral components.

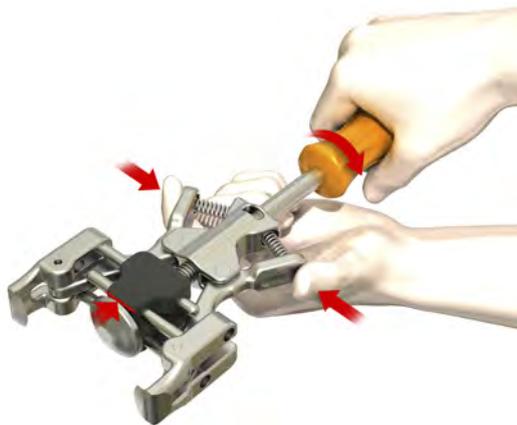


To assist in the release of the femoral component the puncher can be inserted under the anterior flange. Hammer on it for component removal.

It is recommended to position one hand in front of the femoral component in order to hold it when it comes off.

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### Positioning of Extraction Clamp

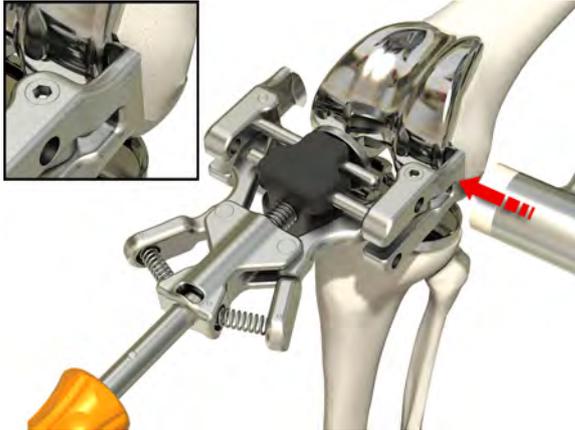


The use of the extraction clamp, assembled to the slap hammer, can also assist extracting the femoral component.

First prepare the clamp by setting the clamp amplitude to the size of the femoral component to be extracted. This is accomplished by holding the clamp open to the desired width and turning the handle counterclockwise until the patella button on the clamp is flush to the inner bumper.

### Important

The clamp is foreseen for femoral components from a M-L width of 50mm to a maximum M-L width of 100mm.



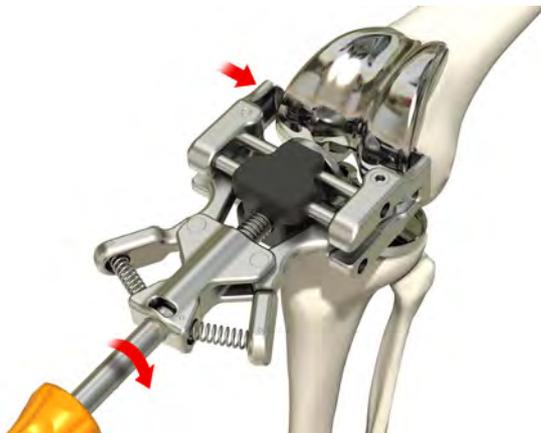
Place one of the clamps between the distal femoral bone and the femoral component (use a hammer if necessary).

**Important**

It is very important that the clamp is properly placed between bone and femoral component. Adequate space must be prepared during the liberation of the femoral component to accept the clamp.

Do not fix the clamp onto the implant walls or in the impactor pockets (if existent) on the medial and lateral sides of the femoral component!

If a femoral distal augment is present (one side), still place the clamp jaws between the femoral component and the augment and very carefully extract the femoral components. If distal augments are present on both condyles, with smaller thicknesses, the clamp jaws can be placed between the augments and the bone.



Finally, place the opposite blade of the clamp between bone and component by tightening the screw handle.



Upon further tightening of the clamp, the patella-shaped button will contact the patella groove of the femoral component. Once the patella button is fully engaged with the femoral component, the extraction clamp will be rigidly affixed.

**Important**

Be aware that when the clamp jaws and the patella button are set in place, the clamp opener grips are securely locked and can not be open.

## Extraction of the Femoral Component

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Assemble the slap hammer to the clamp handle for extraction.

### Important

The slap hammer has to be firmly screwed and flush into extraction clamp handle thread.

As well, do not hammer onto the silicon handle to retract the chisel-blade, but use the slap hammer instead.

If the extraction clamp begins to loosen during the extraction, tighten the clamp by turning the handle clockwise.

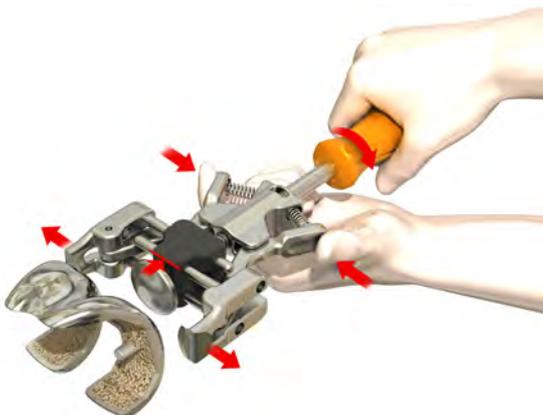


Pull carefully with the slap hammer until the femoral component is extracted from the distal femoral.

## Remove the Femoral Component

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Once the femoral component has been extracted, remove the extraction clamp by releasing the handle. Turn the handle counterclockwise and open the clamp.



# Tibial Component Extraction

Flex the leg approximately 90 degrees to achieve adequate exposure.

## Liberate the Tibia



As with the femoral component, the tibial extraction procedure starts with loosening the tibial component.

By using different chisel blades it is possible to liberate the anterior and lateral/medial regions of the tibial base plate.

### Important

Be aware that most primary tibial components have rotation stabilizing pegs or fins on both sides of the anchorage stem. Use the chisel carefully in order to minimize the risk of creating metal debris.

Do not hammer onto the silicon handle to retract the chisel-blade, but use the slap hammer instead.



By using a curved chisel blade the task of loosening the posterior aspect of the tibial component (around anchorage-pegs or fins) can be made easier.

### Important

If the access is limited (e.g. due to soft tissues/patella extensor apparatus), the lateral compartment can be access from medial side by using the long curved chisel blade.



Alternatively, thin saw blades can be used in order to loosen the tibial component by a frontal medial/lateral access.

### Important

Use the saw blades carefully in order not to contact pegs, fins or the anchorage stem to minimize the risk of creating metal debris.

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## Dislocate the Tibial Component



In order to remove the tibial component, insert the hook adaptor into the tibial PCL recess and use the slap hammer to the component from the proximal tibia.

### Important

If need to hammer the hook in place, please use the foreseen lateral plate on the hook (do not hammer the slap hammer).

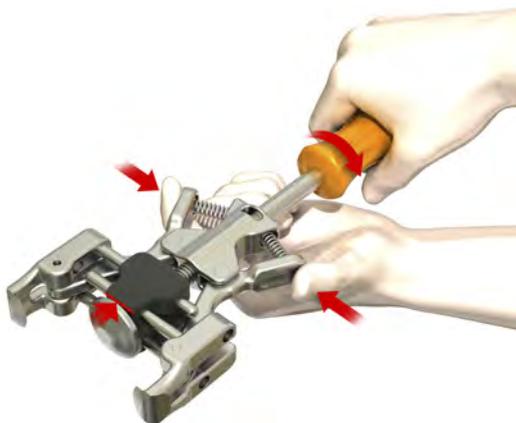


Alternatively, the hook adaptor can be inserted under the lateral or medial side of the tibial component. Use the slap hammer to the component from the proximal tibia.

This is especially important with revision tibial components.

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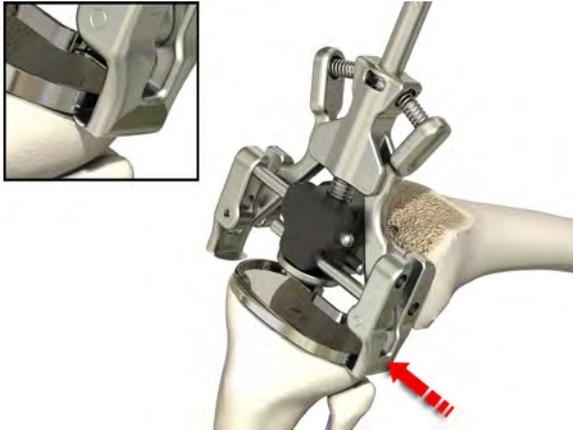
## Positioning of the Extraction Clamp



Similar to the femoral extraction procedure, the extraction clamp is prepared by setting the clamp amplitude to the size of the tibial component to be extracted. This is accomplished by holding the clamp open to the desired width and turning the handle counterclockwise until the patella button on the clamp is flush to the inner bumper.

### Important

The clamp is foreseen for tibial components from a M-L width of 50mm to a maximum M-L width of 100mm.



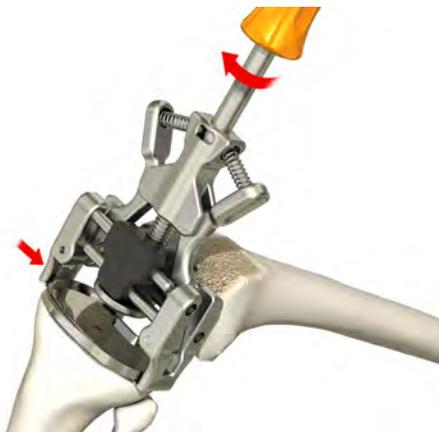
Place one of the clamps between the proximal tibial bone and the tibial component (use a hammer if necessary).

### Important

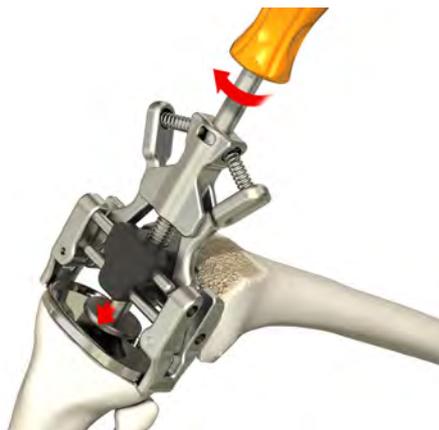
It is very important that the clamp is properly placed between bone and tibial component. Adequate space must be prepared during the liberation of the tibial component to accept the clamp.

Do not fix the clamp onto the implant walls on the medial/lateral or anterior/posterior sides of the tibial component!

If a tibial augment is present (one side/hemi), still place the clamp jaws between the femoral component and the augment and very carefully extract the femoral components. If tibial augments are present on both condyles, with smaller thicknesses, the clamp jaws can be placed between the augments and the bone.



Finally, place the opposite blade of the clamp between bone and component by tightening the screw handle.



Upon further tightening of the clamp, the patella-shaped button will contact the proximal surface of the tibial component. Once the patella button is fully engaged with the tibial component, the extraction clamp will be rigidly affixed.

### Important

Be aware that when the clamp jaws and the patella button are set in place, the clamp opener grips are securely locked and can not be open.

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## Extraction of the Tibial Component

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Assemble the slap hammer to the clamp handle for extraction.

### Important

The slap hammer has to be firmly screwed and flush into extraction clamp handle thread.

As well, do not hammer onto the silicon handle to retract the chisel-blade, but use the slap hammer instead.

If the extraction clamp begins to loosen during the extraction, tighten the clamp by turning the handle clockwise.



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Pull carefully with the slap hammer until the tibial component is extracted from the proximal tibia.

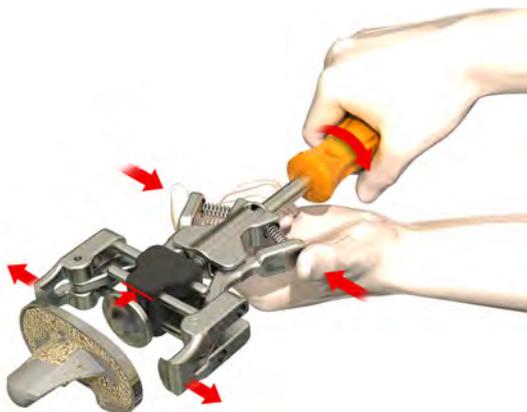


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## Remove the Tibial Component

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Once the tibial component has been extracted, remove the extraction clamp by releasing the handle. Turn the handle counterclockwise and open the clamp.



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### Extraction of Remaining Stem



Once the components have been extracted, if a stem still remains within the intermeduallary canal, use a radial chisel blade to liberate the stem from the canal. Once the stem has been released, remove it from the canal.

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### Extraction of the Patella



If removal of the patella implant is required use a thin chisel blade or saw blade to extract the component.

#### **Important**

check before surgery, during preoperative planning the design of the patella, this to enable a clean and safe extraction.

In case of the removal of a metal backed patella use the saw blade or the chisel blade carefully so as not to contact pegs or other fixation means to minimize the risk of creating metal debris.

If it is necessary to remove the patella component, this step can be performed at any time during the revision surgery. To better access and expose the patella component, it is, possibly after extraction of the tibial insert!

# Sterilization

## **Instruments**

Instruments of the RENOVATION Knee extraction set are not sterile when they are delivered. Before use they must be cleaned by the usual methods in accordance with internal hospital regulations and sterilized in an autoclave in accordance with the legal regulations and guidelines applicable in the relevant country. (For detailed information please refer to “Instructions For Use – Knee Extraction Kit E1390” “mps-precimed.com”). The applicable settings should be verified by the user in accordance with the instructions for use issued by the autoclave manufacturer. Instrument manufacturers and dealers accept no responsibility for sterilization of products by the customer. The chisel blades and saw blades provided as sterile must not be resterilised by the purchaser.

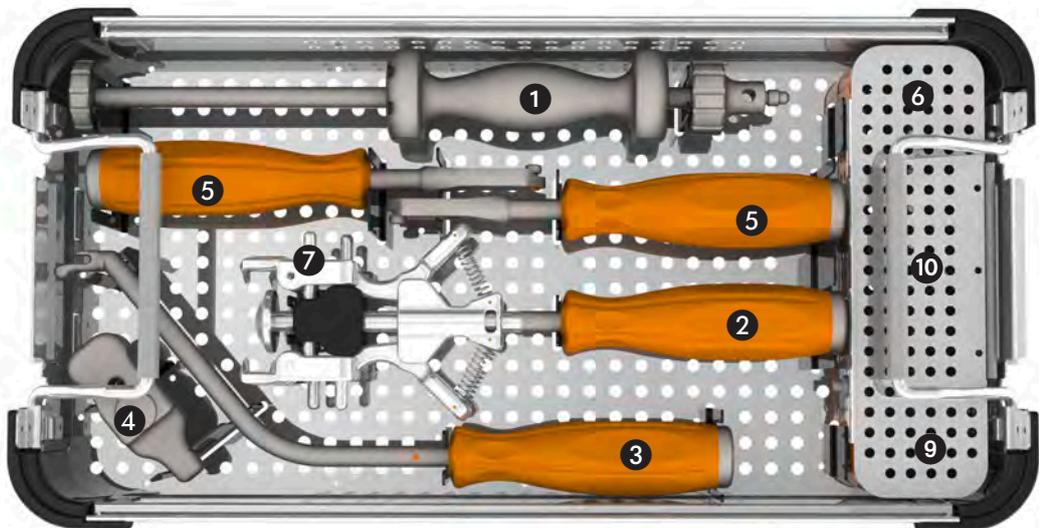
# Instruments

## Knee Extraction Instruments

### RENOVATION Knee Extraction Set (Non-Sterile)

Case Set No.: SAP/Art. No. 75210243/0944290

	SAP/Art. No.	Description	Size	Quantity
	75100391	Case Knee Extraction Instr., Empty	–	1
	75100389	Lid Extraction Instruments	–	1
①	75100394	Slap Hammer	–	1
②	75100382	Extraction Clamp	–	1
③	75100388	Offset Puncher	–	1
④	75100387	Hook Adapter for Slap Hammer	–	1
⑤	75100390	Chisel Handle	–	2
⑥	75018329	Allen Wrench	SW3.5	1



### Spare Part

	SAP/Art. No.	Description	Size	Quantity
⑦	75100684	Extraction Clamp Jaw (1 Side Sym.)	–	1
⑧	75102091	Extraction Clamp Screw (1 Side Sym.)	–	1



## KNEE EXTRACTION INSTRUMENTS

### Chisel-Blades Portfolio (Sterile – Single Use) – 1 mm thick

SAP/Art. No.	Description	Design	Size
9 75100516*	Chisel Blade		8 × 40 × 1 mm S
75100517	Chisel Blade		10 × 40 × 1 mm S
75100518	Chisel Blade		12 × 40 × 1 mm S
75100519	Chisel Blade		10 × 60 × 1 mm S
75100520	Chisel Blade		12 × 60 × 1 mm S
75100521	Long Chisel Blade		8 × 120 × 1 mm S
75100522	Long Chisel Blade		10 × 120 × 1 mm S
75100523	Offset Chisel Blade		8 × 27 × 1 mm – O15 S
75100524	Offset Chisel Blade		10 × 27 × 1 mm – O15 S
75100525	Lateral Chisel Blade		8 × 38 × 1 mm – R10 C
75100526	Lateral Chisel Blade		10 × 35 × 1 mm – R25 C
75100527	Lateral Chisel Blade		10 × 68 × 1 mm – R100 C
75100528	Radial Chisel Blade		9 × 120 × 1 mm – Ø12 S
75100529	Radial Chisel Blade		13 × 120 × 1 mm – Ø18 S
75100530	Radial Chisel Blade		17 × 120 × 1 mm – Ø24 S

### Saw Blades Portfolio (Sterile – Single Use) – Body Thickness 0,40 / 0,50 mm & Cutting Thickness 0,60 mm

SAP No.	Art. No.	Description	Design	Size
10 75100793*	KM519.025	Saw Blade – Synthes / AO		14.00 × 23.00 × 0.40 mm
75100794*	KM519.015	Saw Blade – Synthes / AO		13.40 × 48.00 × 0.40 mm
75100795*	KM51925.C80	Saw Blade – AESCULAP		14.00 × 23.00 × 0.40 mm
75100796*	KM51915.C80	Saw Blade – AESCULAP		13.40 × 48.00 × 0.40 mm
75100797*	KM51925.C81	Saw Blade – AESCULAP 3Ti		14.00 × 23.00 × 0.40 mm
75100798*	KM51915.C81	Saw Blade – AESCULAP 3Ti		13.40 × 48.00 × 0.40 mm
75102288	KM51925A.C62	Saw Blade – STRYKER		14.00 × 23.00 × 0.40 mm
75102289	KM51915A.C62	Saw Blade – STRYKER		13.40 × 48.00 × 0.40 mm
75100803	KM51925.C00	Saw Blade – Linvatec Hall		14.00 × 23.00 × 0.40 mm
75100804	KM71.515	Saw Blade – Linvatec Hall		13.40 × 48.50 × 0.40 mm
75100805*	KM51925.DS	Saw Blade – DeSoutter		14.00 × 23.00 × 0.40 mm
75100806*	KM51915.DS	Saw Blade – DeSoutter		13.40 × 48.00 × 0.40 mm

\* Not available in the US as a stand alone item.

# Documents

## Note

The following documents are available for your assistance.

### Product-accompanying Documents

<b>Description</b>	<b>Lit. No.</b>
Surgical Technique	04044 (2025)
Product Flyer	15943 (2026)
Animated Surgical Technique	04079
Instructions For Use – Knee Extraction Kit	E1390
Instruction for Use - Knee prostheses	12.24
Processing of instruments - guidance from Smith&Nephew	03389

# Notes

## **Manufacturer**

Smith & Nephew Orthopaedics AG  
Oberneuhofstrasse 10d  
6340 Baar  
Switzerland  
[www.smith-nephew.com](http://www.smith-nephew.com)

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Komet Medical  
Gebr. BRASSELER GmbH & Co.  
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